DISCOVERY

An Investigation to Continuum Hypothesis

Lam Kai Shun

Author Affiliation:
Alumni of Department of Mathematics,
University of Hong Kong,
Hong Kong
Email: h9361977@connect.hku.hk

DISCOVERY

SCIENTIFIC SOCIETY

ABSTRACT

Everyone is born with equal rights, and therefore should have an equal opportunity to receive education. Based on the author's previous teaching experience, an empirical teaching model for schools has been developed. Based on this model, an educational philosophy was also discovered, which can be categorized and circulated through teaching, learning, and reflecting. Indeed, through daily experience, this philosophy can be transformed into useful daily applications. The converse of the fact that daily applications can be transformed back into philosophy is also true. Furthermore, the purpose of a case study is rationalization. As such, details of this study will be explained in the following sections. For Penrose's philosophical beliefs, there may be three proposed theories: i) Three types of infinity act as significant stages between the three traditional types of mathematical philosophy and Penrose's three worlds theory. ii) Different types of infinity act as significant stages to connect various types of philosophy, which can be mapped into the multiverse. iii) Inductively, there should be a generalized significance stage that relates to meta-philosophy and the mega-universe. Thus, the aim of this research is to find out the complete solving method of the continuum hypothesis through my suggested research in a book reading investigation. If an in-depth investigation of the continuum hypothesis is required, one may extend the book research project to a larger scale by using big data. Hence, the problem can be viewed and settled in a more detailed manner. Finally, a generalized rationalization theorem will be discovered.

Keywords: Educational philosophy, Continuum Hypothesis

INTRODUCTION

There are usually questions about what educational philosophy is. In general, one may have four types of it, namely: behaviorism, cognitivism, constructivism, and connectionism. I believe that everyone is born with the same right or with equal. One of the aims of education is acting as an upward mobility ladder for common people. In this case, I feel it is a meaningful way of pursuit to help a large number of geographical countries' poorer (one of a case studies is the low socioeconomic Hong Kong residents) in climbing such kind of stairs. Moreover, it is important for students to learn in a classroom with a relaxed, fun, and interactive atmosphere. When I was teaching in different schools, I had the opportunity to learn how to handle various kinds of students. In addition, each school had their own cultural values and traditions, etc. I understand that education is not a simple task and one needs enthusiasm. One may even need to teach students

about what a classical Western life philosophy is. This may include personal ethics which is not just simple facts. I also recommend that teachers should lead students in linking mathematical concepts with daily life (or in the case of experience) together with historical and cultural backgrounds from both Western and Eastern perspectives before really applied into their job when they would be finished schooling.

The lessons I taught in the demo would consist of mathematical theorems – with the proofs (a form of mathematical rationalization) consisting of the why and how designed or in-depth understanding and subsequent thinking through discussion between the teacher and students. These would help developing creative ways of finding an explanation to questions in mathematics. Similar paths could then be applied to other cases. Certainly, there were always unpredictable situations in class, and it was important that I handled pupils with different intellectual qualities, such as EQ, AQ, and IQ, with great care.

In fact, by studying and combining other teaching and learning case studies among my schooling jobs, one can imagine and design a corresponding empirical model. In my proposed prototype, teachers would first raise the curiosity of a small class of pupils through a series of questions, then they may lead pupils to play interactive games designed to provide the necessary corresponding experience, as well as teach them internet information searching skills. Students then collaborate and discuss to develop their ideas on the subject matter, select the most reasonable answers, make the correct decisions with reference to the argument, and finally arrive at a conclusion. Assessments should only be used for determining academic knowledge instead of trying to direct the students' future life. Education professionals can thus apply these amended results to customize different curricula according to the students' abilities. The suggested case studies model should also be intuitively flexible to handle any special conditions in the classroom. The model can then be concluded to pass through a different "Teaching-Learning-Reflecting" circulating periods to explore knowledge and formed my proposed education philosophy in my school lesson.

The teaching-learning-reflecting philosophy is only telling us that a case study can be used to help rationalizing our environment and gave the mapping philosophy. In general, one can convert conceptual things into philosophical theories.

1. Other than what the author states that the "Reflecting" period, there are also "Researching" period. It means both the qualitative and quantitative reflecting data obtained from students' assessment will be collected by the research institute. After detailed analysis, results will be backed to schools for further improvement of teaching and learning. That is the original good wills of Hong Kong TSA. However, what we need to oppose is NOT the examination but the Chinese type of "Mechanical Type of Practices" culture among Hong Kong parents to their children. This author suggests there is a need to revolute against such traditional Hong Kong schooling values.

These systematic thinking can then be transferred into various models (through the case of experienced learning) and thereby apply them to different peaceful, creative daily-life instruments for the good of our society, as well as for other living organisms around the globe. One could even develop a generalisedrationalisation theory when considering different case studies.

Conversely, from our daily life experience (my teaching demo and other school case study lessons), one may imagine the corresponding empirical model and even discover the corresponding philosophy just like the case in pervious paragraphs. Through both forwarding and conversing of theorems, one can refine different various applications to achieve the assisting of humans.

Basically, the more the repeating of the above refining process, the best version of the theory will be given. Indeed, the possible outputs of rationalization will include intelligent cities, quantum brains, or software that humans using for languages translation etc. However, I must emphasize, researchers need to settle all ethical conflicts that could possibly arise before really one tries to produce these applications. In other words, one can get rid of what is called "forced authority" that being compulsory applied to give un-ethical product for the expected outcomes. Hence, my aim is to show that rationalization has a significant role across various subjects. The rationalization of environment can be used to generate a model that adapts to people's daily life requirements. They can then finally be resulted to produce corresponding goods. Web technology is one of case. Web translation software may be the one that most people remember after some mathematical rationalization has been made for the language.

2. Besides a three knowledge exploration periods, there is also a researching period. Hence, as you may observe, such period for knowledge exploration is the forth one. If you look further in-depth, it can be multiple periods or multi-ism. It just likes the problem of "Whether did chicken appear in our world first or eggs first?", and thus sublimes into a philosophical issue. This implies one should NOT struggle for the number of knowledge exploration periods.

Another related interesting case study is the third-generation mobile video conferencing. Initially, the technology was very expensive. There were not too many people who can afford it. More seriously, a large amount of Hong Kong's population was keeping on second generation mobile technology without upgrading. After the invention of computer-internet video chatting software like "Skye" and "Face-time", the price of mobile video conferencing started to fall.

Obviously, it is the effect of breaking monopoly. Gradually, the third-generation mobile communication became popular as the appearance of another chatting software "WhatsApp". It is because the software just consumes cheaper internet broadband in form

of text data only but not relatively expensive instantaneous video conferencing. Therefore, the software attracts lots of people to use. Such kind of revolution concept in chatting software through internet creates an affordable atmosphere for everybody. It can then historically made people changing their everyday habit.

To sum up, one may rationalize any things around our environment. There are certainly pros and cons for it. However, what my really concern is: one should take great care about its ethical effects before make things become true. The following section will focus on the details of what the rationalization is.

CONCEPTUALIZING RATIONALIZATION

3.One of the major reasons for rationalization is that one can always discover things with similar characters (https://www.youtube.com/watch?v=nFKqIy4Rw7Y) and apply them. It allows for sophisticated theories (or computations) to be converted into simpler ones, thereby letting people handle them more easily in another related fields. Through rationalization process, one may even discover a standard form (or generalization) of something, in the former case "Teaching-Learning-Reflecting" periods. Roughly speaking, the generalized form of anything adjoins its relative conjugate (https://www.youtube.com/watch?v=50yhn6c8g84) to the original object, making it rationalized. However, one of the drawbacks when using the model (or alternative identical standardized technology prototype) in a classroom is that pupils will acquire from the lesson only information collection, rather than thinking rigorously within an interactive teacher / student environment. Thus, the idea is to employ a "green conservative life". In other

words, it is important to enjoy a sustainable balance between the old ways (before technology advancement), using of technology (achievement that follows adaption), and a neon Laddish way of living (keeping completely away from new technology to abolish addicts).

In fact, some principles in the family usage of technology have been developed and can be used to avoid abuses of technology (LamNov, 2016 and Lam Aug, 2017). The following section will investigate further the idea of 'rationalism'.

LITERATURE REVIEWS FOR RATIONALISM

Rationalization refers to rationalism. Followers of which believe that by applying certain rational principles in the form of logic, mathematics, ethics, or meta-physics (reasoning and proofs), can eliminate contradictions. In other words, rationalization provides a sense of truth, excluding an individual's perceptions from their own backgrounds. This provides certainty and generality. Thus, under the traditional (historical) beliefs of rationalism, our world is a logical, well-ordered, structured, linked, and intelligible one. When one previously tried to compare different countries' languages, they discovered that there is a possibility for a person to be born with innate ideas. They relate to inborn powers of insight and self-evident principles instead of experiential learning. This is because researchers have found that despite all the diversity among these languages, the common set of syntax is the "existence of a schema with a universal grammar and which is governed by the innate pre-settings of the human mind itself". These are that the mind:

1.Handles the pattern of all experience;
2.Fixes and forms all the rules of meaningful sentences; and
3.Implies that all languages can be translated from one another.

Rationalists face problems when respecting other ways of life (or acquiring knowledge etc.) Their critics mainly come from "Empiricism", which stresses that the source of knowledge is, and can be, tested by a "sense experience". This school of supporters believe in things such as esoteric knowledge, in the form of mystical experience, intuition, and revelation. Some believers in irrationalism usually emphasize the biological, emotional, or volitional, i.e. they try to expand the rational from the perspective of the unconscious or existential.

As rationalism ignores feelings, customs, or authority, supporters think that only reason can be used to determine good or bad (right or wrong). Historically, the philosopher Immanuel Kant held the conviction that one can judge an action through inspecting its consistency in the definition of "What is a lie?" At the same time, when one is talking about religion, devotees accept that all human beings can develop civilized knowledge from the surrounding environment in the absence of supernatural revelation – grace or faith. A new and broader meaning is associated with "reasons" - human cognitive powers – an opposite to the existential approaches to truth. Therefore, rationalist beliefs may contradict those of Christianity. The argument is that Christians trust the Bible was inspired by the Holy Spirt and that the writers did not have such knowledge, i.e. revelation simply implies authority. On

the other hand, rational Christians do not abandon alleged reasoning, even when there is a revelation. Therefore, if one belongs to the rationalist school of Christianity, they propose that only consistent reasoning can be used in the final appeal.

In my opinion, rationalization is a way of making things seem reasonable or sensible. A relationship will be established between the thing and the corresponding out coming model, together with daily products for the good of human beings. However, one should still enjoy technology in a "self-constrained, sensible, and ethical way", instead of abusing it. Finally, God created everything in the universe under His own pre-defined laws. Thus, He must also follow His own rules without any privileges. Otherwise there would be contradictions and our universe would collapse.

Suggested Rationalization Theories for Roger Penrose's Philosophical Beliefs

Proposed Theory 1: Three kinds of infinity act as a form of significant stage between traditional types of mathematical philosophy and Penrose's three worlds theory.

1. As one may observe in previous research, I started with Cantor's theory, which connects "actual infinity", and thus determines the "countability" of a number system, and finally implies the "mathematical world". One will find that these four abstracts are joined and matched in a well-fitted manner. The whole depiction is structured, ordered, and excellently works together to shape my advocated "rationalization of Penrose's theory". In other words, these abstracts are related (detailed arguments have been made in the previous section). For the reasons, the whole justification is very elegant and rather beautiful. I would like to use the term "conscious mathematical architecture" (as I "link" it in a logical sense through ready-made components) or "functional mathematical network" (since each abstract has its own role but is still connected). I trust that one can use these abstracts to describe the complexity of my own "believed mathematical organization". Indeed, my paper is a case study for the "mathematical rationalization of Penrose's theory".

Proposed Corollary 2: Different types of infinity act as different forms of a significant stage, which connects many kinds of philosophy will then be mapped into the multiple worlds or the so- called multiverse.

2. When one steps up to a higher level, there are multiple types of "form" identical to my stated infinity" which I call a "higher stage". One can link different types of philosophy (through rationalization) by such a form of higher stage into multiple universes. These "higher significant stages" act as a key to enter parallel (and in a multiple sense) universes, if they exist.

Proposed Theory 3: Inductively, there is a generalized significant stage, which relates to meta- philosophy and the mega-universe (this directly follows from Theory 1 and Corollary 2).

For further reading on the conceptual ideas behind the explanations as to why we can inductively prove such a theorem, one may look to earlier papers titled "An In-Depth Philosophy Solving the Mystery of Digital Equity", Lam & Sui, August 2017, as well as "The Critics and Contributions of Mathematical Philosophy in Hong Kong Secondary Schools", Lam, May 2016. To pose a question, can one consider the similar situation of the called axiom of infinity set such that they constitute a generalized axiom of infinity set by adding suitable criteria or modifications to the set and logic-al world? Indeed, my suggestion is that one may need to establish a geometrical vector space number theory (Niven, 1992), together with ideas which come from an extension field in algebra (Fraleigh, 2003). If this is done, then one might have a chance to solve the continuum hypothesis problem, say, these "higher significant stages" act as a key to enter parallel (and in a multiple sense) universes, if they exist.

Since the launch of educational technology (in computer studies) in the mid-1980s, there has been a lot of discussion concerning its usage in daily teaching pedagogy. The aim of this research is to study the recommended rationalization theories. Indeed, if one considers the Internet database quiz platform as an analogy of my infinity's significant stage, one may also consider the motivation for reading as a different kind of philosophy. The different kinds of reading books are then multiple worlds. When these books belong to the same category, then it implies they are in the same universe. In addition, various infinities mean different types researching methods. In this research, the author suggests perceptual survey, investigation of online quiz database transaction log, questionnaires, interviews and library transaction logs should be used as ways of collecting both qualitative and quantitative data. Certainly, different kinds of philosophy is considered (different E-Badges for example) as an extra-bond-less besides pupils' pleasure to enhance competition among them. Hence, such a diagrammatic representation can be used to verify my suggestions in the proposed theory section. One could even develop a generalized and rationalized theory from the collected data in the following research section.

To begin with, one should conduct a comparison of reading behavior between three groups of pupils:

1. Borrowing traditional books from school libraries;

2. Purchasing books online, downloading, and reading them on a computer; and

3. A control groups.

An online database quiz system will be set up to handle the information collected from the above groups' book reading activities. At same time, the figures can also be used to investigate how the psychological effects (motivation and goal theories) will influence students' reading habits, in addition to their academic achievements. Furthermore, one can use the research data to answer the study questions concerning the issues surrounding the use of educational technology.

To be more precise, researchers are interested in the following study questions:

1. Why are there differences in the academic results among the reading groups?

2. What are the psychological (social-cultural-psychological theory) impacts on pupils' reading outcomes?

3. Who will get the most benefit from the use of educational technology?

4. How do personality factors influence the appropriateness (i.e. hazards and benefits) of using educational technologies for improving children's reading achievements?

General speaking, when are the best circumstances for humans to use technology in education (or in their daily lives)?

RESEARCH DESIGN AND METHODOLOGY

Research Design

9 local primary schools participated in the research which lasted for one academic year. Participants were students who were enrolled in primary 3, 4, and 5 under the supervision of teachers and teacher librarians. The online quiz database development started 4 months before the research. The system was launched for the Spring/Summer session of the academic year.

Throughout this period, the research team conducted school visits for system support, promotion, and coordination. Data was regularly collected for research evaluation throughout the period. The main purpose of this study was to discover the reading habits of primary students through data obtained from an online quiz database system, and to learn about students' perceptions of its influence. According to Chu 2005, the literature review shows that previous researchers have mainly used surveys (Bailey, 1997; Cole, 1992; Compton, 1989; Cool and Xie, 2000; Culbertson, M, 1992; Holland and Powell, 1995; Hurd, Weller, and Curtis, 1992; Majid and Tan, 2002; Meha and Young, 1995; Simon, 1995; Summers, Matheson, and Conry, 1983; Steffey and Meyer, 1989) in order to estimate searchers' knowledge of sources/databases. Some used search logs (Chu, 1995a; Cool and Xie, 2000; Vakkari, 2000) and interviews (Cool and Xie, 2000; Vakkari, 2000),…."(p.39). From the above arguments, it is proposed that the following evaluation methods for achieving the pre-described objectives should be used.

Use of a Perceptual Survey to Compare Students' Reading Interests

Firstly, it is suggested that students' reading interests should be compared through perceptual surveys. There are different types of surveys, but this study will examine two common types only – knowledge and perception surveys (Kimberly, 2008). Knowledge surveys present questions to determine what people believe they 'know' as truthful information. Perceptual surveys ask questions about what the subjects believe or feel once a topic is given. The main difference between them is that subjects are requested to evaluate rather than determine. For example, a 'style survey' group may want to investigate the number of students who care about their personal style and how their style was originally influenced. The group first proposed that most students take care to dress like the mainstream and will likely have the "latest and greatest" fashions to impress friends and illustrate wealth status. Thus, they might ask questions such as "how much do students care about their personal style?" As can be observed, there is a clear goal for the topic, the subject's complexity slowly becomes apparent when the group attempts to compose the survey. Certainly, there are an indefinite number of factors which contribute to one's 'personal style'. Hence, the survey must consist of an extensive list of questions so as to pinpoint the subject's beliefs. In addition, respondents may not provide truthful or consistent responses about their beliefs, and as such the survey results will depict a skewed picture (Kimberly, 2008).

In the case of educational studies, perceptual surveys try to evaluate a program-me and provide useful information to decision makers (Creswell, 2012). For instance, students and their parents just finishing a suburban community college enrolment options program-me responded to a survey that evaluates the program-me (Kiger and Johnson, 1977). There was a college option which provided opportunities for high school students to participate in community college.

Hence, there was a 23-item survey asking both students and parents about their perceptions, such as whether the program-me helped "formulate long term educational goals" (p.691). It was found that a positive relationship resulted between the students and

their parents whose perceptions were different. Results show that parents wanted the students to use the program-me as a 'hand-son' career identification and planning tool, but students saw the program-me as an opportunity to 'try out' being a college student (Creswell, 2012).

From the above discussion, it is recommended for this present study that a perceptual survey is used to compare students' reading interests. For example, it could be asked "What type of books do students like to read most?" and "Why do they like these types of books?" The data could then be used to evaluate students' reading behavior as well as their hobbies. Thus, the relationship between social goals and reading interests could be discovered.

Investigate Online Quiz Database Transaction Log

A survey alone is not enough meaning to measure students' reading interest. There might be differences between the data acquired from a survey of subjects' self-perceived familiarity/ importance (Chu, 2005). Furthermore, another problem could be whether the students really know how to use the online quiz database. Thus, there is a need to supplement the perceptual survey with a transaction log – a detailed recording of students using the online quiz database – if one wants to find out how social goals affect students' reading habits. This can be done by requesting students keep a diary of their reading activities, by direct observations of their use of the online quiz database, or by requesting students think aloud while they are reading books (Chu, 2005).

Cool and Xie (2000) asked students to keep a diary of their reading activities and record the types of books they read over the course of one work day (Chu, 2005). The advantage to this method is one can determine students' specific use of the online quiz database. It does not require the presence of a researcher to observe and take notes of the interactions between the students and the online quiz database. It is an economical way to gather data on students' actual reading of books (Chu, 2005). However, there is a disadvantage as it relies on accurate recording by the students. Some students might keep a complete record of their reading habits while others might leave out many important details (Chu, 2005).

It is suggested that this study should also include analysis of the transaction log in the research to determine what type of books the students like to read.

Moreover, students should also be encouraged to keep a diary about their reading habits. Hence, by dissecting the students' reading behavior through the methods described in this section, the research goals can be achieved.

Collect Questionnaires from Teachers and Students

This study will employ the Progress in International Reading Literacy Study (PIRLS) 2011 Context Questionnaire Scale. The questionnaire was developed by the International Association for the Evaluation of Educational Achievement (IEA). The PIRLS Learning to Read Survey (Home Questionnaire) asks the students' parents or guardians about their home resources for fostering literacy as well as about their reading habits, highest level of education, and employment situation (Mullis et al., 2013). It also asks about their child's attendance in preschool and literacy- centered activities in the home before the child attended school, such as reading books, singing songs, and writing the alphabet or words. The Teacher Questionnaire asks teachers about their education, professional development, and experience in teaching. It also asks about the instructional activities and materials used in classes selected for PIRLS assessment (Mullis et al., 2013).

As a further 2011 initiative, questionnaire items were chosen so that the response data from students, teachers, principals, and parents could be scaled using the 1-parameter IRT (Rasch) partial credit measurement model (Mullis, 2013). Enough items were drafted for each scale so that the Rasch model could be reliably applied. Many questionnaire items had four response categories– "agree a lot", "agree a little," "disagree a little," and "disagree a lot". A scale comprised of such items required 6-7 items to meet the minimum requirements of Rasch scaling. Scales comprised of items with three response categories required more items. Generally, one or two extra items were developed for each scale to allow for attrition after field testing (Mullis, 2013).

In summary, questionnaires can be collected from both students and teachers about their reading behavior, abilities, and teaching background. They can also act as addendum to the above three methods as data collection helps in gaining an in-depth idea about the study's goals.

Use Interviews to Understand Students' and Teachers' Reasons for Their Choice of Books

The reason for students and teachers choosing books can be ascertained through interviews (Chu, 2005). They can offer a way for researchers to understand the meaning behind students' and teachers' reading behavior (Seidman, 1998). Interviews are well-known as a tool for understanding people's behavior and uncovering the reasons behind choices of book when responding to surveys, or in the students' online quiz database choices. In addition to this method, Cool and Xie (2000) used interviews as a supplementary way to survey and document choices. They interviewed each of their 14 subjects about: (1) their information

behavior associated with the information search activities recorded in the diary; (2) the reasons for their degree of resources used as reported in the survey, and (3) their satisfaction levels with the resources. Therefore, from the above arguments, this study shall use interviews with students and teachers as a method to understand the reasons behind certain reading actions taken regarding their use of the online quiz database (Chu, 2005). By interviewing students and teachers at the end of each reading session, it will help to uncover the reasons behind their choice of books and their use of the online quiz database. This will be done to learn the relationships between goals, the online quiz database, and reading motivation as described in the framework.

Using the Library Transaction Log to Compare the Borrow Rate of Books
One of the most direct methods for measuring students' reading habits is to compare the automatic library transaction log for different books' borrowing rates. The transaction log is machine generated and is a common technique used for obtaining detailed data on people's borrowing processes (Chu, 2005). Wang, Hawk, and Tenopir (2000) suggested that "the advantage of using monitoring data (such as from a transaction log) are that they are accurate, unobtrusive, longitudinal, transactional, temporal, and can be automatically collected and processed (the computer does the work!)" (p.237).

The library's transaction log provides a large quantity of data at minimal cost (Chu, 2005), however, it has its disadvantages. Wang, Hawk, and Tenopir (2000) stated that "there are also some disadvantages, such as the data being open to interpretation (accurate or not), privacy concerns, and the overwhelming amount of data gathered, which can be difficult to manage" (p.237).

According to Jansen, Spink, and Saracevic in 2000, they used a similar method and analyzed 51,473 queries posed by 18,113 users of the Web search engine Excite. They studied two questions: (1) how do the users search the Web? and (2) what do they search for on the Web? They discovered that the users' queries were short and on average, only 2.21 terms were contained in a query. They also found that the users seldom employed Boolean operators where only 1 in 18 users used them. Furthermore, half of users who used these operators made a mistake as defined by

Excite rules. The authors suggested a reason for the simple searches was due to Excite's intelligent search engine simplifying the processes of the users (Jansen, Spink and Saracevic, 2000).

However, the reasons behind people's searches cannot be explored, as is the case with this study's library transaction log (Chu, 2005). Although interviews can be conducted on the reasons for a search, the data captured cannot be as real and accurate as the data captured during the search. Therefore, these findings may not be able to be generalized or applied to other situations (Chu, 2005).

This study's author agrees that the library's transaction log is a useful way to investigate students' reading behavior as pre-described in the reasons above. However, one cannot completely depend on a single method as each of them have their own drawbacks. This means a true picture can be ascertained by using all the methods suggested above, as they will complement each other. Thus, this study proposes using the five methods of determining the effects of goals on the reading habits of upper primary students through use of an online quiz database.

Methodology
Qualitative Measures
In 1996, Gambrell et al., proposed the Motivation to Read Profile. This consists of a conversational interview made up of three sections. The first section investigates the motivational factors related to the reading of narrative text (3 questions); the second section focuses on stories (information) from informational reading (3 questions); and the final section concentrates on some general issues that relate to reading motivation (8 questions).

According to Gambrell et al.(1996), the interview aims to start an extrajudicial, conversational interflow between the teacher and student. Furthermore, in 1980, Burgess suggested conversational interviews are in fact social events that can give us an in-depth understanding of the context rather than through ordinary and rigid interview techniques. Baker (1984), tells us that there are still variations from those conversational interview scripts which are expected and anticipated by researchers. This means that there is omitted or missed information in a more formal, standardized interview approach which can be gleaned from the teacher's deviated conversational interview script. It is up to the teacher to keep in mind that the basic aim of a conversational interview is to gain knowledge that will give authentic insights into students' reading experiences (Gambrell et al., 1996). It is important for those who participate in conversational interviews to allow children to use their distinct methods of depicting their reading motivation and experiences (Denzin, 1970). It also raises ideas and issues that might be related to personal motivation but may not be reflected in the scripted interview items (Denzin, 1970).

Quantitative Measures

Based on the Motivation to Read Profile by Gambrell et al., in 1996, this study developed a modified version of Motivation to Read Survey-Revised which comprises of two parts – a reading survey and a conversational interview (Hauptman, 2012). The survey part consists of twenty items with four answer choices for each. Its format follows the Likert scale. In addition, while there are ten items that measure a reader's self-perceived competence, another ten items try to evaluate students' valuation in reading. The interview portion will be used in the qualitative part of this study (Hauptman, 2012).

Initially, the pool of questions was established based on present research (Deci and Ryan, 1985; Eccles, 1983; Wigfield, 1994) and an analysis according to present instruments (Gottried, 1986; Harter, 1981; Johnson and Gaskins, 1991; McKenna and Kear, 1990; Pintrich and DeGroot, 1990). The selection criteria for items was based on applicability for: (a) grades 2 through 6, (b) teaching approach, (C) group administration suitability, and (d) validity in questions reflecting self-perceived competence and task value (Hauptman, 2012). There is a 4-point Likert scale for survey items which is suitable for the age group. Also, choice varies from most positive to least positive so that one can avoid all the set responses threats. Cronbach's alpha will be used to determine internal consistency which shows moderately high reliability (self-concept = 0.75 and value = 0.82), where Gambrell et al. (1996) showed that the reliability coefficients were determined to be moderately high (self- concept = 0.68 and value = 0.70) (Hauptman, 2012).

In Hauptman's research (2012), he added four task value items and four perceived self- competence items to the original survey format. These new questions were regarding the before, during, and after components of intervention. At the same time, he changed the original survey's wording to fit academic reading. The internal consistency for the Motivation to Read Survey Revised showed high reliability (self-concept = 0.84, task value = 0.81), while the entire revised survey was 0.88 (Hauptman, 2012).

The Mixed-Method Approach

The definition of mixed-method from Johnson, Onwuegbuzie, and Turner (2007), is a type of research where qualitative and quantitative elements are combined for the aims of depthand breadth of evidence and understanding (Hasan, 2014). In 2009, Creswell suggested that the combination of qualitative and quantitative elements in research can be a way to overcome the weaknesses inherent in each method with reference to the strengths of each other. Hence, the mixed-method approach will be used in this research so that it can capture an important depth and breadth of data. Thereby simultaneously answering the proposed research questions with detailed relationships that occurred between the qualitative and quantitative findings (Punch, 1998). This encourages data triangulation through multiple inferences and as a result gives stronger findings and conclusions (Greene, Caracelli, and Graham, 1989). Another advantage in this approach is that the researcher can examine a problem from several perspectives and in doing so, increase research validity (Deacon, Bryman, and Fenton, 1998).

There are four major mixed-method designs outlined by Plano Clark and Creswell (2011): The convergent parallel design – the researcher conducts qualitative and quantitative strands concurrently and weights both equally. Separately analyzed data and the combination of qualitative and quantitative results during the overall interpretation can be found as a result.

1) The explanatory sequential design –- the researcher first conducts the quantitative phase to answer the research questions. This is then followed by qualitative data collection where the design is based on the results of the quantitative data analysis so that the findings can be explained.

2) The exploratory sequential design – this begins with qualitative data collection which is then followed by a quantitative phase for testing or generalizing the findings during the qualitative phase. The embedded design – the researcher adds a supplementary strand to the main type of research so that the overall design can be enhanced.

3) The transformative design – the researcher employs a transformative theoretical framework that defines all other decisions such as priority, mixing, timing, and interaction.

4) The multiphase design – this is a combination of sequential and concurrent strands with the aim of program-me evaluation to support the development, adaptation, and evaluation of a specific program.

As mentioned earlier, the present research attempts to investigate the effectiveness of the reading habits of primary students using an online quiz database. To do so, the explanatory sequential design (Clark and Creswell, 2011) was adopted, which enabled further investigation into the quantitative findings obtained through the perceptual survey, the PIRLS questionnaire, and the transaction logs respectively. This was done in depth, and through qualitative interviews aimed at finding out the reasons behind reading habits. An explanatory sequential design is required to start a weighted more quantitative phase, which will then be followed by a qualitative phase. The main goal of the quantitative phase is to address the research questions, while the subsequent qualitative phase tries to explain and elaborate more comprehensively, upon the initial results. This is the most well-known mixed-method design and is referred to as the sequential model (Tashakkori and Teddlie, 1998). The important aspect of the design is its straightforwardness. This is because only one type of data can be collected at any one time, while the design of second phase is

based on the results of the initial phase. Factors to consider are the amount of time required for the two phases of data collection, and how the designation of qualitative phase can be decided, as it is only made after the initial quantitative data has been analyzed (Hasan, 2014). To conclude this section, one may transform qualitative data into quantitative data or vice versa, through an "Academic Scholar's Research Methods Conversion Algorithm". It is found in the Appendix 1. However, one must stress that the algorithm may be subject to certain ethical arguments and must face careful consideration before the actual application of collecting the data.

Ethical Considerations, Significance, and Applications

The significance of this paper is that: it is the first one to use mathematical set theory in terms of symbol to connect material, body and spirit world together for the building of our first thinking computer. This is because the consequence of such action implies Penrose's three world philosophy and thus a quantum mind. But there are several controversial consequences from the case if the rationalization of society happens (http://study.com/academy/lesson/rationalisation-of-society-definition-examples-quiz.html):

1) **Efficiency**: achieving the maximum results with a minimum amount of effort; I think there may be a lack of 'warmth' or always have an 'alienated relationship' among human beings since everything is viewed from productivity.

2) **Predictability**: a desire to predict what will happen in the future; my critique is: If one can forecast the future, crimes may be prevented as everything can be predicted. But there are always some unexpected, mirrored, and irrational effects that can occur, which requires an explanation.

3) **Calculability**: a concern with numerical data, i.e., statistics and scoring; I opposed to it because not all matters can be expressed in terms of data and there is something which can be presented only qualitatively or have other semantic meanings.

4) **Dehumanisation**: employing technology to control human behavior; I believe thatit is hard to control what people might do. The reason being is that most of us have our own ideas, views, and wills which are under the influence of different internal and external factors. One of the usages of my mathematical rationalization (in particular) is in translating different countries' language. Most reasons have been shown in the section of 'historical views of rationalism' but one requires some more detailed academic studies. At the same time, we also need to investigate all the moral issues that will arise.

Furthermore, the rationalization can be applied into the proof of the famous "Continuum Hypothesis". The main problem is: Does there exist something (named the set as "X0") like the inequality "N0<X0< C"?. There is controversy when discussing the conflict that exists between traditional attitudes and 'my pure reasoning of rationalization' in terms of set theory and symbolic-logic. Therefore, it is sensible for us to investigate why such different outcomes may occur. In fact, from my 'suggested rationalization theories', it recommends that there is a set X0 situated between natural number and real number. On the contrary, Cantor told us that such X0not exist (ref. Cantor's first uncountability proof and Cantor's diagonal argument). Later, both Gödel and Cohen showed that X0 could not be proved or disproved either (https://plato.stanford.edu/entries/goedel-incompleteness/).

But most mathematicians (including this author) believes there is a natural set together with its power set. In addition, every non-denumerable subset of power set should be equivalent or not to the power set. This implies 'CH' must either be true or false despite Gödel's long-established demonstration. To show 'CH' is incorrect, one needs to persuade others for the possibility of sets with larger cardinalities than those of ZF + AC. Thus, one may disprove the 'CH' through the establishment of a 'Generalized Axiom of Infinity' (https://www.britannica.com/topic/set-theory/The-Neumann-Bernays-Godel-axioms). One of the historical cases is the appearance of 'New Foundation' (NF) in mathematics.

It makes a modification by ignoring the original set and changing it into a 'local' type theory, and hence get the better of the Russell Paradox. This raises the question: "Can the current way of combining both 'Set Theory' and 'Logic' have sufficient conventions to compose such an axiom?" In fact, from the specimen, one can eliminate those deficiencies by proposing suitable modifications in the depicted planet. Similarly, one recommends adding the necessary criteria or amendments to the present 'Set and Logical World' which will include the 'axiom'. Then a mathematical researcher may completely solve both 'CH' and 'GCH' problems from these   persistence of what one refers to as midway sets "X0".

Another application is artificial intelligence (AI), as Penrose's Theory implies a quantum mind and hence a quantum computer. There is an ethical consideration that is associated with AI. Thus, we must solve this ethical issue before it happens. Hence, our purpose for this study is to investigate the ethics and challenges surrounding the development of AI.

Remarks and Comments

There are several remarks and comments to my research. They are:

I. What are the foundational bases of mathematics?

One is 'Set Theory'. The following set of theoretical bases are widely assumed in the literature review of this essay:

1) An undefinable concept or object (may be a set);
2) An undefinable binary membership or predicate;
3) Axioms concerning extensionality, pairing, union, power set, and induction;
4) An axiom of schema (i.e. separation).

Furthermore, the base can be extended to obtain a stronger Cardinal Theory. At the same time, we may add a logical inference rule and finally describe mathematics completely with a set theory. One may even generalize the relationship between logic and set theory, where the process can be expressed as follows (http://mathhelpforum.com/discrete-math/192522-assumptions-set-theory.html):

Informal logic --> set theory --> formalization of logic

However, one may have another base of mathematics in terms of the 'Topoi Theory'. It is indeed a type of category which contains sheaves of sets on a topological space (or site). One may consider it in some sense as 'a notion of localized category of sets' or 'a generalization of point set topology'. The significance of Lam, Feb 2016 is that it tries to use mathematical set objects (Platonism) to rationalize Penrose's Three Worlds Philosophy (certainly, there is an anti-Platonism school which opposes the existence of such objects).

My suggestion is that one can use different kinds of infinity (such as actual, potential, and absolute), where they can establish a 'bridge' between mathematical philosophies (in terms of argumentative proofs from different perspectives among logic-ism, intuitionism, and formalism) and the Count-ability of Number, the Big Bang Theory, and the Existence of God. This directly implies the Platonic Object World, the Physical World and the Mental World. Hence, we have clearly made Penrose's Three World Theory rational (or reasonable). If we assume a 'quantum mind', according to the quantum theory (https://arxiv.org/pdf/0805.0116.pdf) (as it tells us that quantum mechanics is only a randomized process in a combinatorial way), hence we should have a freedom of thought and decision making. Therefore, this will form another philosophical question for our possible future AI (but not for this research):

Q1: What kind of things should it be pleased – beauty in its sense?
Q2: How can it determine the correctness of thought – morality in its sense? Q3: When will things become real facts – truth in its sense?

Indeed, one believes that "facts, AI software, and quantum computers" constitutes as the three most significant components for our next generation of robots, like a robot named 'Data' in a recent movie – Star Trek. It is because information should be processed by AI software through a physical quantum computer to get the calculated results. Otherwise, we cannot make use of our advanced scientific achievements. Thus, this author proposes that we should study the nature of 'infinity' for it is shown as a key to investigate our human (quantum) mind and hence develop our own quantum computer. Certainly, we should also study our brain scientifically through biological, chemical, physical, and mathematical theories, experiments and models as well as another subjects' learning field etc. Then, like the robot named 'Data', it will become feasible. The research methodology will be shown in amended Lam, 2016.

CONCLUSIONS AND LIMITATIONS

In the previous proposed case study prototype (Teaching-Learning-Researching Case Study Model), teachers may first raise the curiosity of a small number of pupils through a series of questioning, then they lead pupils to attempt interactive games to gain corresponding experiences, internet information searching for necessary knowledge, collaborations, and discussions for one to develop an individual's own views or comments on the topic, select all feasible answers, make necessary decisions with reference to sufficient arguments and finally draw conclusions. I trust that all assessments can only be used for determining academic knowledge but not necessary to define one's future life direction. Education professionals can thus apply these results to customize different curricula according to students' respectable and guidance images amount youngsters. The consequence of this is happy and enjoyable abilities. The designed model should also be flexible to handle the special conditions of a classroom.

On the other hand, a teaching professional must not treat adolescents as a 'factory product'. Thus, one cannot only use a single model to simulate the whole teaching-learning-researching process. The reason is that each person has irreplaceable characteristics even if all educational outcomes are the same. By premeditate human as a product, one will thus easily fall into a virtuous dilemma, like the application of DNA editing – "shall we design a perfect baby in the future? Why should we?" Or "shall we introduce suitable laws to restrict the birth of genetically modified babies? How and What?" Beside ethics, a teacher should be sympathetic, legitimate, and patient etc. together with suitable exhortation (but not in a destructive way) towards their pupils. As a result, the schoolmaster may indicate teacher-student relationships that might immediately set-up rather than disturb classmates.

In a nutshell, there are both pros and cons for using technology in education. I believe that technology can change human habits, such as our online culture. However, it can also be hazardous, as previously mentioned in the introduction section. Thus, my suggestion is: rather than just having a 'green conservative life', one should also implement 'self-restricted, reasonable, and conscientious relationships' between machines together with their daily usage, which will prevent the abuse of technology. My proposal and research have only been running for two years; it only suggests the study of some elementary theories and facts of related issues. One may require further reading and investigation for all concerned matters, rather than just focusing on my future thesis.

Remarks:

This author notes if one can extend the book reading project into a larger scale, one may employ big data for a detailed research to both continuum hypothesis and find a generalized rationalization theorem. Then one may discover an in-depth and more accurate results for our future related fields (mathematics and scientific) investigations.

Appendix 1 (subject to several moral controversies)
Part I: Researcher's Conversion Algorithm that Alters Qualitative Data into Quantitative Data.

How can one transform qualitative research data (study methods including interviews, surveys, and case study etc.) into quantitative data?

I should emphasise that in some sense the recommended set of rules may be subject to a morally controversial issue. It is because **not** everything can be converted into quantitative data. Indeed, there are both contributions and critics for the aforementioned proposed transformation and one can find them from other professional resources such a university library. According to these ethical considerations, I believe that academic scholars who use an "**Academic Scholar's Research Methods Conversion Algorithm**" (developed by Leung, Lam, van Aalst, and Jin Mu, Faculty of Education, HKU, 2017) between qualitative and quantitative methodology must handle it with great care.

A. Qualitative Data Collection Status:

Step 1: (Invitation Phase) – Send invitation requests to desired organisations (such as schools) and ask participants (such as students and teachers) to participate in the survey.
Step 2: (Answering Phase) – Selected teachers form schools must fill in the questions (both quantitative and qualitative) as stated in the questionnaire for investigation.
Step 3: (Interview Phase) – From the answers in the questionnaires, choose 10 - 20 teachers to have in depth interviews.
Step 4: (Analysis Phase) – Analyse the data collected from both questionnaires and interviews.
What method should we use for the synthesis of qualitative data?

B. Synthesis of Qualitative Data Process:

Phase I: (Open Coding) – Researchers should first read the required transcripts line-by-line and then categorise the data into discrete elements or in terms of "Crucial Phrase and Labelled Word".
Phase II: (Axial Coding) – During this process, scholars develop abstract concepts and organise them according to their categories. One may discover relationships between data and points mentioned repeatedly by participants.
Phase III (Selective Coding) – With help from the ground theory, it will reflect the main idea from the data and induce either the diagram or narratives.

C. Data Analysis Section:

1. Researchers should first conduct a frequency analysis for examining the extent of each main code in the coding scheme. Hence, one can find the potential mechanisms, knowledge quality, and the implications of findings for the specific study.

2. Scholars will select several main codes to perform qualitative analysis. Then one can elucidate interviewees' details. Simultaneously, one should use the frequency analyzed data quantitatively:

3. One will show and prove the obtained results are comparable with other surveys. Also, the quantitative analyzed data will be presented.

4. The researcher may use a 2x2 between subject ANOVA with dependent and independent variables.

5. One may set the level of significance for all analyses to 0.05.

6. From the outcome of the hypothesis, one may find out a statistical conclusion and hence an implication.

7. We remark that the reverse operation - "A Conversion Algorithm that transforms quantitative data into the Qualitative one" can be found in the 'Results' section of my paper: "Optimization Strategies for Solving Students' Digital Equality and Scholarly Outcomes" with the following web-link: http://ssrn.com/abstract=3007304

In fact, one can even trace back to find the categories, cases studied together with the interviewees' answers from both the correlation and probability tree diagram etc.

*****All the details concerning the above algorithm will be depicted in the coming thesis. To conclude, one must warn that the algorithm may lead to an ethical misconduct. One should consider the pros and cons before use, and it should be operated with extreme caution or under the permission of research authorities. *****

Declaration:

I declare that all the content presented in this paper is purely my work and that all of the references have been well quoted under corresponding citations (as far as I know). There are no conflicts of interest for this paper. There are also no funding sources for this paper. I thank to my former Department's professor — Prof. Siu Man Keung and Dr. Leung Kam Tim. I also thank the library of the University of Hong Kong for kindly lending me related books for this paper's referenced work. The library inspires me very much.

Conflict of interest

The authors declare that they have no conflict of interest.

Funding:

There are no funding sources for this paper.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Data and materials availability:

All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. Ames, C.A. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84,* 261-271.

2. Bailey, B. (1985). Thesis practicum and the librarian's role. Journal of Academic Librarianship, 11(2), 79-81.

3. Baker, C.D. (1984). The search for adultness: Membership work in adolescent adult talk. Human Studies, 7, 301-323.

4. Baker, L. and Wigfield, A. 1999. Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research*

Quarterly, 34: 452–477.

5. Blaine, B., & Crocker, J. (1993). Self-esteem and self-serving biases in reactions to positive and negative events: An integrative review. In R. F. Baumeister (Ed.), Self-esteem: The puzzle of low self-regard (pp. 55-85). New York: Plenum Press.

6. Burgess, R. (1980). Field Research: A sourcebook and field manual. London: Allen & Uwin.

7. Chu, S. (1995a). Difficulties that may be encountered by students in searching the Dow Jones News/Retrieval

database and the UMI Proquest full-image databases. Proceedings of the International Online Information Meeting, London, UK, 19, 81-100.

8. Chu, Kai-wah, Samuel. (2005). Development of information search expertise of research students. http://hdl.handle.net/10722/134022.

9. Cole, K. (1992). Doctoral students in Education and factors related to the literature review process. Unpublished master thesis, Fort Hays State University.

10. Compton, M.L. (1989). A study of the information resources and library services used by doctoral students in science education at the University of Georgia. Unpublished master thesis, University of Georgia.

11. Cool, C. and Xie, H. (2000). Patterns of information use, avoidance and evaluation in a corporate engineering environment. Proceedings of American Society of Information Science Annual Meeting. USA, 37, 462-472.

12. Cordova, D. I., & Lepper, M. R. (1996). Intrinsic motivation and the process of learning: beneficial effects of contextualisation, personalisation, and choice. Journal of Educational Psychology, 88(4), 715–730.

13. Covington, M.V. (2000). Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Psychology, 51*, 171-200.

14. Creswell, J. W. (2009). Research Design: Qualitative, quantitative and mixed method approaches (3rd ed.). Los Angeles: Sage Publication Inc.

15. Creswell, J. W., & Plano Clark, V. L. (2011). Designing and conducting mixed methods research (2nd ed.). Los Angeles: Sage Publication Inc.

16. Creswell, J.W., (2012). Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research. Pearson

17. Cross, S. E., Bacon, P. L., & Morris, M. L. (2000). The relational-interdependent self-construal and relationships. Journal of Personality and Social Psychology, 78, 791-808.

18. Culbertson, Michael. (1992). Analysis of searches by end-users of Science and Engineering CD- ROM databases in an academic library. CD-ROM Professional, 5(2), 76-79.

19. Deacon, D., Bryman, A., & Fenton, N. (1998). Collision or collusion? A discussion and case study of the unplanned triangulation of quantitative and qualitative research methods. International Journal of Social Research Methodology, 1(1), 47-63. doi: 10.1080/13645579.1998.1084 6862.

20. E.L. & Ryan, R.M. (1985). Intrinsic motivation and self-determination in human behaviour. San Diego, CA: Academic Press.

21. Denzin, N. (1970). The research act in sociology. London: Butterworth.

22. Dowson, M., & McInerney, D. M. (2001). Psychological parameters of students' social and work avoidance goals: A qualitative investigation. Journal of Educational Psychology, 93, 35-42.

23. Dowson, M., & McInerney, D. M. (2003). What do students say about their motivational goals? Towards a more complex and dynamic perspective on student motivation. Contemporary Educational Psychology, 28, 91-113.

24. Dowson, M., & McInerney, D. M. (2004). The development and validation of the Goal Orientation and Learning Strategies Survey (GOALS-S). Educational and Psychological Measurement, 64, 290- 310.

25. Dowson, M., & McInerney, D.M. (2005). Facilitating conditions for school motivation: Construct validity and applicability. *Educational and Psychological Measurement, 65*, 1046-1066.

26. Dweck, C.S., & Leggett, E.L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.

27. Eccles, J. S., Adler, T. F, Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J., & Midgley, C. (1983). Expectancies, values and academic behaviours. In J. T. Spence (Ed.), Achievement and achievement motives (pp. 75-146). San Francisco: Freeman.

28. Elliot, A.J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169-189.

29. Elliot, A.J., & McGregor, H. (2001). A 2 x 2 achievement goal framework. *Journal of Personality and Social Psychology, 80,* 501–519.

30. Elliot, A.J. (2005). A conceptual history of the achievement goal construct. In A.J. Elliot & C.S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 52-72). New York: Guilford Press.

31. Elliot, A. J. (2008). Approach and avoidance motivation. In A.J. Elliot (Ed.), *Handbook of approach and avoidance motivation* (pp. 3-14). New York, NY: Taylor & Francis.

32. Ford, M. E. (1992). Motivating humans: Goals, emotions, and personal agency. Newbury Park, CA: Sage.

33. Gambrell, L.B., Palmer, B.M., Codling, R.M., Mazzoni, S.A. (1996). Assessing motivation to Read. The Reading Teacher Vol.49. No.7, International Reading Assessment: pp.518-533.

34. Gottfried, A.E. (1986). Children's academic intrinsic motivation inventory. Odessa, FL: Psychological Assessment Resources.

35. Harackiewicz, J.M., Barron, K.E., Carter, S.M., Lehto, A.T., & Elliot, A.J. (1997). Predictors and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73,* 1284-1295.

36. Harter, S. (1981). A new self-report scale of intrinsic versus

extrinsic orientation in the classroom: Motivational and informational components. Developmental psychology, 17, 300-312. Hasan, D.C. (2014). Teachers' Classroom Behaviour and Its Impact on Students' Foreign Language Anxiety, Motivation, and Achievement. Faculty of Education, Monash University.

37. Hauptman, A.L. (2012). Guided Reading and Motivation. Theses, Student Research, and Creative Activity: Department of Teaching, Learning and Teacher Education. University of Nebraska – Lincoln.

38. Hofstede, G. (1980). Culture's consequences: International differences in work-related values. Newbury Park, CA: Sage.

39. Hofstede, G. (1991). *Cultures and organisations: Software of the mind*. London: McGraw Hill. Holland, M.P., Powell, C.K. (1995). A longitudinal survey of the information seeking and use habits of some engineers. College and Research Libraries, 56(1), 7-15.

40. Hui, C.H. (1988). Measurement of individualism-collectivism. *Journal of Research in Personality, 22,* 17-36.

41. Hurd, J.M., Weller, A.C., Curtis, K.L. (1992). Information seeking behaviour of faculty: Use of indexes and abstracts by scientists and engineers. Proceedings of the American Society for Information Science Annual Meeting, 29, 136-143.

42. Inal, Y., & Cagiltay, K. (2007). Flow experiences of children in an interactive social game environment. British Journal of Educational Technology, 38(3), 455–464.

43. Johnson, C.S., & Gaskins, J. (1991). Reading attitude: Types of materials and specific strategies. Reading Improvement, 28 237-242.

44. Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. Journal of Mixed-Methods Research, 1(2), 112-133. doi: 10.1177/1558689806298224 Kiger, D. M., & Johnson, J. A. (1997). Marketing the perceptions of a community college's postsecondary enrolment options program. Community College Journal of Research and Practice, 21, 687–693.

45. Kimberly S.O., (2008). Margaret Marshall *Composing Inquiry: Teachers' Resources* Prentice Hall King, R.B. (2012). Studying for the sake of others: the role of social goals on engagement and well-being. Http://hub.hku.hk/handle/10722/193013

46. King, R.B., McInerney, D.M., &Yeung, S.S.S. (2012, March): *Social aspects of achievement motivation: A multi-method study on social goals*. Invited lecture at the Faculty of Education, Cambridge University.

47. King, R.B., McInerney, D.M., & Watkins, D.A. (2011a). Competitiveness is not that bad…at least in the East: Testing the hierarchical model of achievement motivation

in the Asian setting. *International Journal of Intercultural Relations.* Published Online First 3 December 2011. Doi: 10.1016/j.ijintrel.2011.10.003.

48. King, R.B., McInerney, D.M., & Watkins, D.A. (2011b, September). Social goals and learning Strategies Paper presented at the 14th Biennial Conference of the European Association for Research Learning and Instruction Conference, Exeter, United Kingdom

49. King, R. B., & Watkins, D. A. (2011a). Cross-cultural validation of the five-factor structure of social goals: A Filipino investigation. Journal of Psychoeducational Assessment. Published online before print. doi: 10.1177/0734282911412542.

50. King, R. B., & Watkins, D. A. (2011b). The reliability and validity of the Goal Orientation and Learning Strategies Survey (GOALS-S): A Filipino investigation. The Asia-Pacific Education Researcher, 20, 579-594.

51. Lepper, M. R., & Malone, T.W. (1987). Intrinsic motivation and instructional effectiveness in computer-based education. In R. E. Snow, & M. J. Farr (Eds.), Conative and affective process analyses: Vol. 3. Aptitude, learning and instruction (pp. 255–286). Hillsdale, NJ: Lawrence Erblaum.

52. López, O. S. (2010). The Digital Learning Classroom: Improving English Language Learners' academic success in mathematics and reading using interactive whiteboard technology. *Computers & Education*, *54*(4), 901-915.

53. Maehr, M.L., & Zusho, A. (2009). Achievement goal theory: The past, present, and future. In K. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 77-104). New York: Routledge.

54. Majid, S. and Tan, A.T. (2002). Usage of information resources by computer engineering students: a case study of Nanyang Technological University, Singapore. Online Information Review, 26(5), 318-325.

55. Malone, T.W. (1980). What makes things fun to learn? Heuristics for designing instructional computer games. In Proceedings of the 3rd ACM SIGSMALL symposium and the first SIGPC symposium on small systems. NY: ACM.

56. Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. Psychological Review, 98, 224-253.

57. Markus, H. R., &Kitayama, S. (1994). The cultural construction of self and emotion: Implications for social behaviour. In S. Kitayama& H. R. Markus (Eds.), Emotions and culture: Empirical studies of mutual influences (pp. 89-130). Washington, DC: American Psychological Association.

58. McClelland D.C., Atkinson, J.W., Clark, R.A., & Lowell, E.L. (1953). The achievement motive. New York: Appleton-Century-Crofts.

59. McClelland D.C., (1961). The Achieving Society. Free Press, New York

60. McInerney, D.M., & Ali, J. (2006). Multidimensional and hierarchical assessment of school motivation: Cross-cultural validation. *Educational Psychology, 26*, 717-734.

61. McKenna, M.C., & Kear, D.J. (1990). Measuring attitude toward reading: A new tool for teachers. The Reading Teacher, 43, 626-639.

62. Mehta , U., Young, V.E. (1995). Use of electronic information resources: A survey of science and engineering faculty. Science Technology Libraries, 15(3), 43-54.

63. Mullis, I.V.S. & Martin, M.O. (2013). Relationships among Reading, Mathematics, and Science Achievement at the Fourth Grade—Implications for Early Learning. Timss & Prils International Study Centre, Lynch School of Education, Boston College.

64. Murray, H. A. (1938). Explorations in personality. New York: Oxford University Press.

65. Parker, L. E., & Lepper, M. R. (1992). Effects of fantasy contexts on children's learning and motivation: making learning more fun. Journal of Personality and Social Psychology, 62(4), 625– 633.

66. Printrich, P.R. & DeGroot, E.V. (1990). Motivational and self-regulated learning components of classroom academic performance. Journal of Educational Psychology, 82, 33-40.

67. Pintrich, P. R. (2000a). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92,* 544–555.

68. Pintrich, P.R. (2000b). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451-502). San Diego: Elsevier. Punch, K. (1998). Introduction to social research: Quantitative and qualitative approaches. London: Sage.

69. Roberts, T., &. Nolen-Hoeksema, S. (1989). Sex differences in reactions to evaluative feedback. Sex Roles, 21, 725-747.

70. Roberts, T., & Nolen-Hoeksema, S. (1994). Gender comparisons in responsiveness to others' evaluations in achievement settings. Psychology of Women Quarterly, 18, 221-240.

71. Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The motivational pull of video games: a self- determination theory approach. Motivation & Emotion, 30(4), 347–363.

72. Ryan, A. M., & Shim, S. S. (2006). Social achievement goals: the nature and consequences of different orientations toward social competence. Personality and Social Psychology Bulletin, 32, 1246-1263.

73. Ryan, A. M. & Shim, S. S. (2008). An exploration of young adolescents' social achievement goals and social

adjustment in middle school. Journal of Educational Psychology, 100, 672-687.

74. Schoenbach, R., Greenleaf, C., & Murphy, L. (2012). *Reading for understanding: How Reading Apprenticeship improves disciplinary learning in secondary and college classrooms*. John Wiley & Sons.

75. Schwalbe, M. L., & Staples, C. L. (1991). Gender differences in sources of self-esteem. Social Psychology Quarterly, 54, 158-168.

76. Seidman, I. (1998). Interviewing as qualitative research. New York, NY: Teachers College Press. Simon, C.E. (1995). Information retrieval techniques: The differences in cognitive strategies and search behaviours among graduate students in an academic library. Unpublished doctoral dissertation, Wayne State University, Michigan.

77. Steffey, R.J., Meyer, N. (1989). Evaluating user success and satisfaction with CD-ROM. Laserdisk Professional, 2,35-45.

78. Stevenson, H. W., & Lee, S. (1990). Context of achievement, Monographs of the Society For Research in Child Development, Serial no. 221, Vol. 55, Nos.1-2

79. Stigler, J. W., Smith, S., & Mao, L. W. (1985). The self-perception of competence by Chinese children. Child Development, 56, 1259-1270.

80. Summers, E.G., Matheson, J., Conry, R. (1983). The effect of personal, professional, and psychological attributes, and information seeking behaviour on the use of information sources by educators. Journal of the American Society for Information Science, 34(1), 75-85.

81. Sweetser, P., & Wyeth, P. (2005). GameFlow: a model for evaluating player enjoyment in games. ACM Computers in Entertainment, 3(3), 1–24.

82. Tashakkori, A., & Teddlie, C. (1998). Mixed methodology: Combining qualitative and quantitative approaches. Thousand Oaks, CA: Sage.

83. Thrash, T.M., & Elliot, A.J. (2001) Delimiting and integrating achievement motive and goal constructs. In A. Efklides, J.Kuhl, & R.Sorrentino (Eds.), Trends and prospects in motivational research (pp.1-19) Dordrecht, The Netherlands: Kluwer Academic.

84. Triandis, H. C. (1989). Collectivism vs. individualism: A reconceptualisation of a basic concept in cross-cultural social psychology. In G. K. Verma & C. Bagley (Eds.), Cross-cultural studies of personality attitudes and cognition (pp. 60-95). New York: St Martins.

85. Tripathi, R., & Cervone, D. (2008). Cultural variations in achievement motivation despite equivalent motivational strength: Motivational concerns among Indian and American corporate professionals. Journal of Research in Personality, 42, 456-464.

86. Urdan, T., & Maehr, M.L. (1995). Beyond a two-goal

theory of motivation and achievement: A case for social goals. *Review of Educational Research, 65,*213-243.

87. Vakkari, P. (2000). Cognition, sources and contributory information of documents in writing a research proposal: a longitudinal case study. In: Kraft, Donald H., education. ASIS 2000: Proceedings of the American Society for Information Science (ASIS) 63td Annual Meeting: Vol.37; 2000 November 16-20; Chicago, IL. Medford, NJ: Information Today, Inc. for ASIS; 2000. 352-362.

88. Van Yperen, N.W., Elliot, A.J., & Anseel, F. (2009). The influence of mastery-avoidance goals on performance improvement. *European Journal of Social Psychology, 39(6),* 932-943.

89. Wentzel, K. R. (1989). Adolescent classroom goals, standards for performance, and academic achievement: An interactionist perspective. Journal of Educational Psychology, 81, 131– 142.

90. Wentzel, K. R. (2000). What is it that I'm trying to achieve? Classroom goals from a content perspective. Contemporary Educational Psychology, 25, 105-115.

91. Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991). Transitions during early adolescence: Changes in children's domain specific self-perceptions and general selfesteem across the transition to junior high school. Developmental Psychology, 27, 552-565.

92. Wigfield, A. (1994). Expectancy-value theory of achievement motivation: A developmental perspective. Educational Psychology Review, 6, 49-78.

93. Wigfield, A. (1997). Reading motivation: A domain-specific approach to motivation. Educational Psychologist, 32, 59-68.

94. Wu, WWY., Chu, SKW., Chan, H., Wong, J., Tse, SK., Tavares, N., Mok, SWS (2014). Strengthening students' reading comprehension ability (both Chinese and English literature e-quiz bank on the cloud. The 19th International Education and developing children's litera-Technology Conference, Hong Kong, 2014.

95. Zuckerman, D. M. (1989). Stress, self-esteem, and mental health: How does gender make a difference? Sex Roles, 20, 429-444.

96. Niven, I; Zuckerman, H.S; Montgomery, H.L; (1992); An Introduction to The Theory of Number; (Fifth Edition); John Wiley & Sons, Inc.

97. Horowitz, R; Samuels, S.J; (2017); The Achievement Gap in Reading; Complex Causes, Persistent Issues, Possible Solutions; (First Published); Routledge Taylor & Francis Group.

98. Fraleigh, B.J; (1993); A First Course in Abstract Algebra; (5th Edition); Addison Wesley Publishing Company.